

Case Number

## **INVENTION RECORD**

### **1. Short, descriptive title of the invention**

Large solid center wound veneer

### **2. Inventors**

a.) Last Name, First Name, Middle Initial  
Dalton, Jeffrey, L.

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Street Address, City, State, Zip  
14 Sleepy Hollow Rd, Dartmouth, MA 02747

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Citizen of Country  
USA

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b.) Last Name, First Name, Middle Initial  
Cavallaro, Chris

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Street Address, City, State, Zip  
17 Bachand Rd., Lakeville, MA 02347

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Citizen of Country  
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c.) Last Name, First Name, Middle Initial  
Halko, Roman

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### **3. What do you think the invention is?**

This invention is a design of large solid center wound cores with a veneer type double covers. The large solid center is made using rubber with a Mooney value between 40 and 60, a high specific gravity filler, and a trans-conversion catalyst. The compression of the core is low, the deflection of the core @ 130 kg -10 kg is in the range of 3.3 to 7 mm. The core diameter is between 1.38 and 1.50 inches (35 - 38 mm). The core has an intrinsic frequency of 1500 – 3500 hz.

The wound layer is made using polyisoprene thread that has a thickness in the range of 0.018 – 0.028 inches. The thread is wound with an elongation of 500 - 1000% to a wound ball diameter of 1.54 – 1.58 inches.

The cover is formed from two or more layers. Each layer has a thickness of 0.020 – 0.040 inches. The inner layer is formed from a thermoplastic having a hardness of greater than 55 shore D (measured by ASTM D-2240). The inner layer may be comprised of an ionomer, a polyamide, a polyetherester, or a metallocene.

The outer layer may be comprised of a cast thermoset urethane, a RIM thermoset urethane, an injection molded thermoplastic polyurethane, or a metallocene. The outer cover has a shore D hardness of less than 55.

The ball has a dimple count between 300 and 500, and a total dimple volume greater than 500 mm<sup>3</sup>.

**4. How does it work?**

The large, low compression center has high velocity because of the high mooney rubber, trans-conversion chemistry, and high gravity fillers. It's low compression reduces spin on the driver and long irons. The thread layer keeps the velocity high and provides a cushioning layer to improve the feel of full shots. The cover uses the veneer construction. The hard inner cover also keeps velocity high while maintaining the low spin performance on drivers and long irons. The thin outer cover layer increases spin on the short irons and partial shots. It also provides a soft feel on greenside shots and putts.

**5. Are there any other uses for your invention?**

No

**6. What is new about your invention and how does it improve on the present situation?**

This construction maximizes velocity and minimizes driver spin while providing increased short iron spin and feel in a wound veneer type ball. The veneer double cover construction is new compared to the wound prior art, the wound construction is new compared with the multilayer prior art.

**7. Do you know of any published literature relevant to your invention? What concept(s) that you have found appears closest to your invention...and how is your invention different? Where have you looked and what did you find?**

Patents:

5,397,129 – Sumitomo

Our core is harder than 60 shore A.

5,445,387 – Bridgestone

Our core is harder than 45 shore C.

5,704,852 – Sumitomo

Our core is larger than 1.378 inches.

5,704,853 – Bridgestone

Our dimple volume ratio is greater than 0.9%.

5,752,888 – Bridgestone

Our core is larger than 1.378 inches.

5,810,677 – Bridgestone

Our core is larger than 1.339 inches

5,827,167 – Hogan

Hogan teaches and claims a single cover layer.

5,848,942 – Sumitomo

Sumitomo teaches and claims a single cover layer.

5,853,337 - Sumitomo

Sumitomo teaches and claims a single cover layer.

5,976,035 – Bridgestone

Bridgestone teaches an adhesive layer between cover layers.

5,993,968 – Bridgestone

Bridgestone teaches and claims a single thermoplastic urethane cover layer.

6,054,550 – Bridgestone

Bridgestone claims two thermoplastic urethane cover layers.

6,083,120 - Bridgestone

Bridgestone claims a thermoplastic elastomer center.

W0 99/39781 – Maxfli

Maxfli teaches and claims a single cover layer.

**8. When and where was the idea of the invention first conceived? Who participated?**

The invention was conceived on \_\_\_\_\_ by J.Dalton, C.Cavallaro, and R.Halko

**9. When did you make the first notes or sketches? Where?**

This invention record is the first written record. Also notes in CA 842.

**10. Has your invention only been demonstrated in your laboratory, or has it been used outside (ex: Pilot Run in the plant or a trial at another manufacturing facility)?**

**Summarize the results that best demonstrate your invention ("Best mode"). Please identify where the results are recorded.**

Best mode:

**Center:** 1.4 inch, comprising CB23 (50 mooney) rubber, DTDS trans-conversion catalyst, 33 phr ZDA, and tungsten

**Windings:** 0.024 inch thick thread wound at 800% elongation to a wound ball diameter of 1.560 inches

**Inner cover:** 50% 8945 Na ionomer, 50% 7940 Li ionomer, 64 shore D, 0.035 inch thick.

**Outer cover:** RC11b cast urethane , 45 Shore D, 0.030 inch thick.

**Dimples:** 392 dual dimple icosahedron pattern, dimple volume 590 mm<sup>3</sup>.

Available data:

Core compression: 50

Deflection @ 130 kg – 10 kg: 4.26 mm

**11. Has the invention been disclosed outside the company?**

No

- If yes, was a non-disclosure agreement signed?

- Please give date of the event \_\_\_\_\_

- Describe event:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**12. Signature of inventor(s)**

a.) Inventor

Jeffrey C. Dalton

Date

\_\_\_\_\_

b.) Inventor

Christopher Cavallaro

Date

\_\_\_\_\_

c.) Inventor

Roman Hallio

Date

\_\_\_\_\_

Witness#1

MTA

Witness#2

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**EXHIBIT B**

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Case Number TFJ00-015

## **INVENTION RECORD**

### **1. Short, descriptive title of the invention**

Large Center Wound Ball with a Veneer Cover

### **2. Inventors**

a.) Last Name, First Name, Middle Initial

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d.) Last Name, First Name, Middle Initial

Morgan, William E

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**3. What do you think the invention is?**

(Describe in a few sentences what is novel about your invention)

The previous veneer application (now US Patent #5,885,172) teaches that a veneer technology cover may be used with both solid and wound cores. Most of the specification and claims are directed towards the solid core applications. This invention extends the art further into wound core technology, in particular into large solid center wound balls.

**4. How does it work?**

(Please provide a detailed description of the invention. You can use sketches, drawings, flow sheets, chemical equations, etc. to help understanding by others.)

The veneer cover concept allows a thin, soft cover layer to be applied to an otherwise hard covered, low spin construction. The result is a ball that retains low spin and long distance on the driver and long – mid irons, but has high spin and soft feel on the short irons and partial iron shots.

The large solid center wound constructions also have hard covers and provide low spin. Their performance can likewise be improved by incorporating a thin, soft outer cover layer.

**5. Are there any other uses for your invention?**

(This answer will help to get the broadest possible patent protection and identify other areas where there may be relevant prior art)

**6. What is new about your invention and how does it improve on the present situation?**

(You might wish to answer one or more of the following questions: What are the technical problems it will solve? What are the commercial problems it will solve?)

The present large solid center products have either a hard cover which creates low driver and halfwedge spin and hard feel (DT Spin) or a soft cover that creates high driver and halfwedge spin and a soft feel (Maxfli Revolution.) This invention provides the best attributes of both type and eliminates the deficiencies of both. It produces low driver spin plus high halfwedge spin and a soft feel.

**7. Do you know of any published literature relevant to your invention? What concept(s) that you have found appears closest to your invention...and how is your invention different? Where have you looked and what did you find? If you have not yet looked, do so now. Do not proceed without at least a search of US Patents in the last 20 years. A searchable database is available online and we have copies of all golf patents in house. ("Literature" includes other patents, patent applications, published papers, conference proceedings, trade literature, magazine articles, etc.)**

5,762,568 (Sumitomo) teaches solid center, wound double cover balls. The outer cover is ionomer, 0.040" – 0.120" thick, and less dense than the inner layer. (vs ours – cast urethane, 0.020 – 0.050 in, and more dense)

5,772,530 (Sumitomo) teaches the main component of both cover layers is an ionomer.

5,628,699 (Bridgestone) teaches an ionomer outer cover layer.

5,674,139 (Bridgestone) teaches an outer layer formed from a resin that is defined in the specification as ionomer or balata.

5,704,854 (Bridgestone) claims a solid center wound ball. Claim 7 states that the cover is ionomer or balata and may be single or multilayer.

5,752,888 (Bridgestone) claims a solid center wound ball. Claim 6 states the outer cover is made from a resin of 43 to 53 shore D. Claim 8 states the outer cover is made from a resin selected from ionomer resins, balata, polyurethane based thermoplastic elastomers, polyester based thermoplastic elastomers, and polyamide based thermoplastic elastomers. 5,766,096 (Bridgestone) claims a solid center, wound double cover ball. The specification teaches the same materials as 5,752,888 (above). 5,792,009 (Bridgestone) teaches a liquid center, wound core covered with a thermoplastic polyurethane cover. 5,846,142 (Bridgestone) teaches a solid center wound, double cover ball. The cover is typically balata and ionomer resin. 5,976,034 (Bridgestone) teaches a solid core, intermediate cover layer, a wound layer, and an outer cover layer. The intermediate and outer cover layers are both ionomers or blends of ionomers with other thermoplastics.

8. **When and where was the idea of the invention first conceived? Who participated?**  
(It is important to note whether the invention was made in collaboration with people - including vendors and consultants - in other departments or even other companies. Focus on "Inventor" - the person(s) who thought up or imagined or produced the invention for the first time through the use of imagination or ingenious thinking and experimentation. You should not list "implementers" who simply take the inventor's instructions and fabricate something.)

The general concept was included in the original veneer invention record (Hebert & Morgan) and further defined by Dalton and Boehm on

9. **When did you make the first notes or sketches? Where?**

This invention record is the first record.

10. **Has your invention only been demonstrated in your laboratory, or has it been used outside (ex: Pilot Run in the plant or a trial at another manufacturing facility)? Summarize the results that best demonstrate your invention ("Best mode"). Please identify where the results are recorded.**

(You may attach copies of formal project reports if this is more convenient. Test results provide evidence that the invention works and provides the intended result)

**Best mode:**

center diameter - 1.386 inch  
compression - 80  
thread - 0.024"x0.0625"  
wound ball size - 1.560"  
inner cover - Na/Li surlyn - 70 shore D  
inner cover thickness - 0.040"  
inner cover diameter - 1.620"  
outer cover material - cast urethane - 52 shore D  
finished ball size - 1.682"

**Ranges:**

1.000 - 1.550  
40 - 100  
(0.014" - 0.030")x0.0625"  
1.520 - 1.600  
60 - 74  
0.020 - 0.050  
1.580 - 1.640  
45 - 59

physical properties in process

11. **Has the invention been disclosed outside the company?**

NO

- If yes, was a non-disclosure agreement signed?
- Please give date of the event \_\_\_\_\_



- Describe event:

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**12. Signature of inventor(s)**

(You must have two witnesses - one of which must be director level or above. Each witness must have read and understood the invention record.)

a.) Inventor

J. Dalton

Date

\_\_\_\_\_

b.) Inventor

H. Boeh

Date

\_\_\_\_\_

c.) Inventor

[Signature]

Date

\_\_\_\_\_

d.) Inventor

[Signature]

Date

\_\_\_\_\_

Witness#1

[Signature]

Address

65 RYAN ST

NEW BEDFORD, MA 02740

Witness#2

[Signature]

Address

80 RHODE ISLAND AVE #8

NEWPORT RI 02840



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Application of: J. DALTON et al.

Attorney Docket No: 20002.0010

Application No.: 09/775,793

Group Art Unit: 1712

Filed: February 5, 2001

Examiner: D. Buttner

For: WOUND GOLF BALL HAVING CAST  
POLYURETHANE LAYER

**DECLARATION OF HERBERT C. BOEHM UNDER 37 CFR § 1.131**

Commissioner for Patents  
PO Box 1450  
Alexandria, Virginia 22313-1450

Sir:

I, Herbert C. BOEHM, hereby declare that:

1. I am a citizen of the United States, and reside at 34 Judge's Hill Drive, Norwell, MA 02061.
2. I am one of the inventors of the invention disclosed and claimed in the above-identified patent application.
3. I have been employed by ACUSHNET COMPANY (formerly doing business as Titleist and Foot-joy Worldwide) since January 1, 1988, 333 Bridge Street, Fairhaven, MA 02719, the Assignee of record of the entire, right, title and interest in the invention claimed in the present application.
4. I presently hold the position of Executive Vice President and General Manager, Golf Ball Operations.
5. This declaration is filed to show that prior to November 27, 2000, my co-inventors and I conceived the subject matter of the claimed invention and reduced it practice shortly thereafter.

6. Attached hereto are Exhibits A, B, C, and D. Exhibits A and B include copies of two invention records showing conception of the invention; Exhibit C includes a copy of U.S. Patent No. 5,885,172, of which the instant application claims priority and the invention record in Exhibit B references as a building block for the present invention; and Exhibit D includes a copy of U.S. Patent No. 6,132,324, of which the instant application claims priority. The dates of Exhibits A-B have been deleted in accordance with standard practice, but the documentation included therein is prior to November 27, 2000.
7. Exhibit A includes an invention record demonstrating conception of a large solid center wound core with a veneer cover. In particular, Exhibit A details a golf ball having a low compression polybutadiene core formed from CB23, a wound layer, a multilayer cover with an outer cover layer formed of cast thermoset urethane, e.g., RC11b and having a thickness in the range of 0.02 inches to 0.04 inches. As explained in the instant application, CB23 is a commercially available rubber material having a resilience of 55 at 100°C. *See* Page 18, lines 13-22. In addition, the instant application provides that RC11b urethane is a thermoset polyurethane (prepolymer to curative ratio of less than 1) having an NCO content of 6 percent. *See* Page 57, Example 5. The invention record was written prior to November 27, 2000.
8. Exhibit B demonstrates conception of a large center wound ball that incorporates the veneer technology of the grandparent application filed May 27, 1997, now U.S. Patent No. 5,885,172 (Exhibit C), which is discussed in greater detail below. In particular, the invention record details a wound golf ball having an ionomer resin inner cover and a cast urethane outer cover. The invention record was written prior to November 27, 2000.
9. Exhibit C includes grandparent U.S. Patent No. 5,885,172, which details a veneer cover over a polybutadiene core. In particular, the '172 patent teaches a golf ball with a solid center, a wound core, an inner cover, and a thermoset polyurethane outer cover layer.

**See Col. 5, lines 6-8 and 41-45; Col. 6, lines 26-36 and 56-64. The present invention was intended to improve upon the technology provided therein.**

- 10. Exhibit D includes parent U.S. Patent No. 6,132,324, which details a golf ball with a core, an inner cover layer, and an outer cover layer. In particular, the '324 patent teaches that the outer cover layer may be formed of a thermoset castable reactive liquid material (Col. 5, lines 8-10 and 19-21), preferably polyurethane. In addition, the '324 patent teaches that the core, which may be polybutadiene, can be covered with elastic windings. Col. 7, lines 1-9 and 36-46. The present invention was intended to improve upon the technology provided therein.**
- 12. I have reviewed the documents of Exhibits A - D. Although the dates of Exhibits A-B have been blanked out, the dates are all prior to November 27, 2000. I hereby confirm that the work evidenced by the documents of Exhibit A-B and all the acts relied upon in this Declaration were carried out by me or by someone acting at my direction in the United States prior to November 27, 2000.**
- 13. The inventors and patent counsel worked with reasonable diligence to prepare and file an application shortly after conception. This work included providing further working examples of the present invention. I hereby confirm that the work evidenced in the instant application was carried out by me or by someone acting at my direction in the United States with reasonable due diligence in order to reduce the conceived invention to practice.**

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully Submitted,

Date: April 21, 2004

Herbert C. Boehm

Herbert C. BOEHM